Small Business Innovation Research/Small Business Tech Transfer

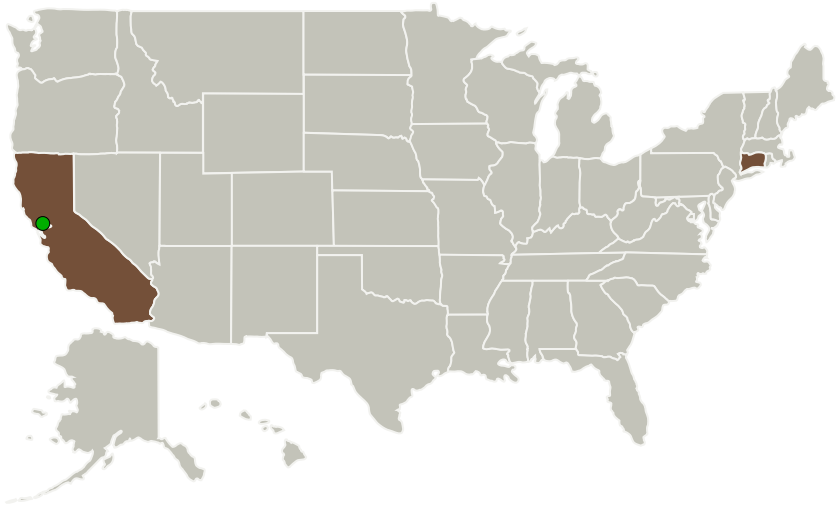
Fault Management Technologies, Phase I

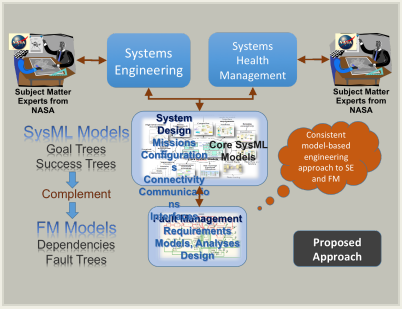
Completed Technology Project (2014 - 2014)

Project Introduction

Given that SysML is becoming a standard for model-based systems engineering and Integration (SE&I), system health management (SHM)-related models will either be done in SysML, or be done outside of SysML but enabled by conversion, mapping, and traceability of information across SysML and SHM models. Given that current implementations of SysML are not particularly useful to perform analyses, and that SHM analyses are not identical to typical SE&I-related analyses, there will need to be connectivity between SysML representations and SHM models that perform SHM-related analyses. Qualtech Systems, Inc. (QSI), with Dr. Stephen Johnson as a consultant intends to explore and develop the integration of model-based systems engineering and Integration (SE&I) using SysML with system health management (SHM) modeling and analysis using QSI's Testability Engineering and Maintenance System (TEAMS). An overarching objective of this proposal is to reduce the duplicative and disjoint effort by NASA's subject matter experts in the development of systems engineering and design models as well as systems health management/fault management models. The intent is to leverage the success space or intent based system design models and transform them for developing fault management models and ensuring changes in design have a natural flow-through to the FM domain, thereby keeping FM models in sync with the design through a semi-automated process. This is one step in the larger set of issues that will need to be addressed in the development of the model-based Discipline of Systems Engineering and its concurrent integration with SHM to achieve higher-quality designs while reducing the costs of SE&I.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Qualtech Systems, Inc.	Lead Organization	Industry Minority-Owned Business, Small Disadvantaged Business (SDB)	Rocky Hill, Connecticut
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations	
California	Connecticut

Project Transitions

June 2014: Project Start

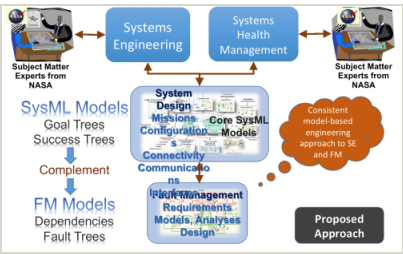
December 2014: Closed out

Closeout Summary: Fault Management Technologies, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/140609)*

Images



Briefing Chart Image
Fault Management Technologies, Phase I
(https://techport.nasa.gov/image/132929)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Qualtech Systems, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Sudipto Ghoshal

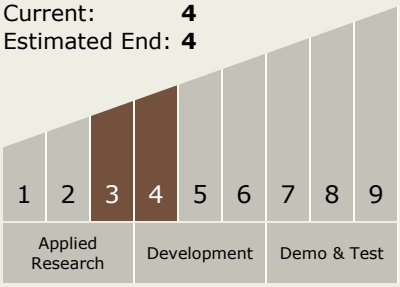
Co-Investigator:
Sudipto Ghoshal

Fault Management Technologies, Phase I

Completed Technology Project (2014 - 2014)

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX07 Exploration Destination Systems
  - TX07.3 Mission Operations and Safety
    - TX07.3.2 Integrated Flight Operations Systems

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System